(3 Hours) **[Total Marks: 80]**

N.B.: 1. All Questions are compulsory
2. Figures to right indicate full marks

Q. 1 (a) Answer the following questions. **(8)**

i. Give an example of an anticancer agent that works as a mitosis inhibitor (no structure)
ii. Give the name and structure of a Non-Nucleoside Reverse Transcriptase Inhibitor with a cyclopropyl moiety
iii. Give the name and structure of a nitrite containing cardiovascular drug
iv. Give the name and structure of a β-blocker used as antiarrhythmic agent
v. Give the name and structure of a Non-steroidal potassium sparing diuretic
vi. Give the name and structure of a nitrosourea analogue used in brain tumours
vii. Give the name and structure of a thiazolidinedione containing drug and indicate it's use
viii. Give the name and structure of a biguanide

Q. 1 (b) Answer the following questions. **(8)**

i. State whether the following statements are True or False and make necessary corrections
   a. Quinine and Quinidine are mirror images of each other
   b. All ACE Inhibitors are amphoteric in nature
ii. Given below are the chemical names of drugs used in the treatment of hypertension. Draw their structure and state to which class they belong
   a. 1-(4-amino-6,7-dimethoxy-2-quinazolinyl)-4-(2-furoyl)-piperazine
   b. 1-(isopropylamino)-3-(1-naphthyloxy)-2-propanol
iii. Give two examples with structures of synthetic HMG-CoA Reductase Inhibitors
iv. Histamine has two pka values of 5.80 and 6.40. Draw the ionized forms of histamine that correspond to these two pka values. Also draw the two tautomers of histamine

Q. 1 (c) Match the following: **(4)**

i	Dasatinib	a	Carbonic Anhydrase Inhibitor
ii	Zanamivir	b	ACE Inhibitor
iii	Lisinopril	c	HIV Protease Inhibitor
iv	Methazolamide	d	Neuraminidase Inhibitor
		e	Tyrosine Kinase Inhibitor

Q. 2.

a. Classify antimetabolites used as antineoplastic agents giving one example from each class **(4)**

OR

a. List the N-mustard drugs that function as alkylating agents. Describe their mechanism of action and SAR.
b. List the therapeutic targets exploited in the treatment of HIV infection. Give the structures and mechanism of action of drugs acting upon any two targets **(4)**
c. Give structure and explain the mechanism of action of the following vasodilators **(2)**
   i Hydralazine
   ii Minoxidil
d. Explain the mechanism of action of Fibrates and outline the bioactivation of Clofibrate **(2)**

Q. 3.

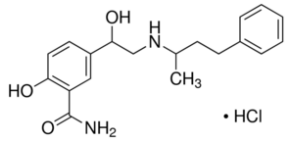
a. Discuss Sodium Channel Blockers as Antiarrhythmic agents **(4)**

OR

a. Outline synthesis of Procainamide with reactants and reaction conditions **(3)**
Give an example of an antiarrhythmic agent with Potassium Channel Blocking activity **(1)**

b. Discuss the structural features of the 1st and 2nd generation sulfonylureas.
Support your answers with relevant structures **(4)**

c. Identify the structure and comment on the stereochemistry of the molecule with respect to its activity **(2)**



d. Explain the mechanism of action of Omeprazole **(2)**

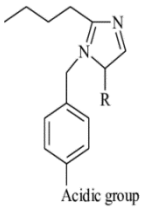
Q. 4.

a. Discuss the mechanism of action and SAR of antiviral acyclic nucleosides **(4)**

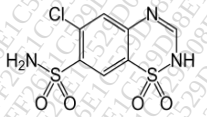
OR

a. Outline the synthesis of amantadine giving reactants and reaction conditions **(4)**

b. What structural features and / or modifications are essential in the following scaffold for angiotensin II receptor blocking activity. Give relevant examples **(4)**



c. Answer the following questions with respect to the structure given below (any two) **(2)**



i State the acidic functional group present in this structure
ii Give the effect of replacing the C_6-H with Cl function
iii Give the name and use of a drug having this scaffold

d. Esmolol is the shortest acting β-blocker. Explain **(1)**

e. Give name of GLP-1 receptor agonist which is a DPP-IV inhibitor. **(1)**

Q. 5.

a. Give the advantage of second generation H_1 antagonists. With respect to loratidine and cetirizine explain the structural modifications that resulted in the decreased CNS side effects **(4)**

OR

a. Outline the strategy that led to the structural derivation of the H_2 antagonist cimetidine from histamine **(4)**

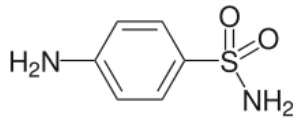
b. Enlist the anticancer antibiotics, discuss their essential structural features and mechanism of action **(4)**

c. Give examples of the following **(2)**
   i An aldosterone agonist
   ii A renin inhibitor

d. Give metabolites of the following **(2)**
   i. Ezetimibe
   ii. Lidocaine

Q. 6.

a. Discuss the structural modifications on the following scaffold to yield diuretic activity **(4)**



OR

Outline the synthesis of furosemide with reactants and reaction conditions **(3)**
Give the name and structure of an aldosterone antagonist **(1)**

b. List the structural classes of Calcium Channel Blockers. Give examples of each class with structure **(4)**

c. Outline the synthesis of Chlorambucil with reagents and reaction conditions at each step **(3)**

d. Name one prodrug used as an angiotensin-II receptor blocker **(1)**
